



## STATE & PRIVATE FORESTRY FOREST HEALTH PROTECTION SOUTH SIERRA SHARED SERVICE AREA



**Report No. SS10-08**

**File No. 3420  
May 19th, 2010**

**To: Tina Terrell, Sequoia National Forest, Forest Supervisor  
Steve Hanna, Sequoia National Forest, Forest Silviculturist  
Rick Larson, Kernville Ranger District, District Ranger**

**Re: Insect and Disease Risk on Joey Project, Sequoia National Forest, Kernville Ranger District**

On September 23, 2010, district foresters Brian Bergman and John Gonzales requested the assistance of Forest Health Protection to evaluate current stand conditions possibly at risk for insect and disease activity of Joey Project, Kernville Ranger District, Sequoia National Forest. NEPA documentation for Joey Project was completed in 1999 under CASPO (California Spotted Owl Agreement), thereby guidelines and regulations vary slightly from the current 2004 Sierra Nevada Framework. Work was contracted and initiated in 2002 but not completed; 537 acres remain untreated. The district is proposing these acres for new bids in 2011 using original documentation. This report covers present conditions, observations, and discussions during the field visit to several locations of the project.

### **Background**

Joey Project is located on the western side of the Kern Plateau (Township 23 S, Range 34 E, Sections 29-32). General geography is west-side of Kern Plateau, upper Salmon creek subwatershed, roughly from Horse Meadow south to Big Meadow.

Elevation ranges between 7000 and 9000 feet. 446 acres of the total proposed 537 acres is mixed conifer-pine, site class 3. Natural stands are chiefly Jeffrey pine intermixed with white fir, sugar pine, and occasional California black oak (see Figure 1).

Topography and aspect delineate species composition on the landscape: sunny, exposed rocky slopes harbor more pines with some fir in the understory; north faces contain dense clusters of variable-aged white fir (see Figure 2). Average diameter ranges are in the moderate size category, 15-21 inches DBH. Scattered legacy Jeffrey pines are seen throughout the project area and are planned for leave. Aspen and Lodgepole pine group in dense homogeneous stands along wet drainages or meadows of Salmon Creek.



Ninety-two plantation acres of Jeffrey pine (n) were initiated after a wildfire in 1960. Plantations have nearly closed canopies with little understory brush; a few variable sized white firs and oaks comprise a small percentage of the stand composition. Plantation diameters ranged from 6 to 18 inches (median 15 inch DBH).



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### **Observations and Current Conditions**

Insects and disease presence in and around proposed project units appeared low, but do have characteristics that would be considered at moderate to high risk for bark beetle infestation. Jeffrey Pine Beetle (*Dendroctonus jeffreyi*) (JPB) activity was detected in several scattered pockets, primarily in smaller diameter trees. Group kills were estimated to have occurred in 2008 and 2009; no new 2010 attacks were found. Attacked trees also evidenced attack from pine engravers and woodborers, and red turpentine beetles. Ground survey estimates find an average rate of one Jeffrey pine (greater than 16 inches) lost annually to Jeffrey pine beetle or other mortality agent.





White fir was clustered among pines in natural stands and densely overstocked. Tight groups of young fir trees counted as many as 50 stems within a 1/20 acre plot (see Figure X). White fir composed a higher percentage of understory regeneration, but few trees greater than 25 inches were observed. Large mature firs in stands were categorized with Dwarf Mistletoe Ratings of 4-6<sup>1</sup>. General tree loss of pines for this area is fairly low and widespread mortality is often attributed to fir engraver attacking white fir. According to 2010 Forest Health Monitoring Aerial Survey<sup>2</sup>, white fir mortality associated with fir engraver doubled since 2009; over 3000 acres in detected directly east in the Dome Land Wilderness, Sequoia National Forest.



<sup>1</sup> Hawksworth Dwarf Mistletoe Rating System.

<sup>2</sup> USDA Forest Service, Forest Health Monitoring Aerial Detection Surveys 2010. More information can be found at: <http://www.fs.fed.us/r5/spf/fhp/fhm/aerial/index.shtml>



## **Discussion of Management Options**

Jeffrey pine beetle is a native bark beetle that only prefers a singular host, Jeffrey pine. During years of average rainfall, Jeffrey Pine Beetle caused mortality is typically low as populations are regulated by natural enemies, climate, and availability of susceptible hosts (Smith et al. 2009). Attacks can occur in groups or singular mortality of large diameter individuals. Outbreaks are most often triggered by drought events that create severe resource competition between trees, decreasing overall resistance and vigor. High levels of bark beetle-caused mortality have been correlated with periodic drought events in California (Smith, 2007). Recent drought conditions had most likely incited Jeffrey pine beetle activity in many areas of Lake Tahoe Basin Management Unit and Inyo National Forest where acreages of legacy-sized trees were lost.

No Action Alternative – Current stand conditions are at moderate risk to potential bark beetle infestation. According to 2006 Forest Health Monitoring Insect and Disease Risk model<sup>3</sup> which factors in existing vegetation data, it is estimated that 25-50% of tree basal area within the project boundaries will be lost within the next 15 years unless conditions change. Basal areas in natural stands and plantations range from 30-600 ft<sup>2</sup>/acre in Joey Project, most of which would be considered overstocked and considered above the threshold for potential attack by bark beetles in pines (greater than 120 ft<sup>2</sup>/acre).

Dwarf mistletoe infection onto developing understory hosts will continue, weakening growth and development. Stem cankers increase potential for hazard tree risks and mechanical damage. Complexes of root disease, stem cankers, and dwarf mistletoes in white firs contribute to increasing susceptibility to fir engraver caused mortality.



Dead trees in the forest can also provide benefits to other components of the ecosystem. Several bird species such as the California Spotted Owl greatly depend on large snags for foraging and nesting. Snags and fallen logs contribute to providing habitat for other species of mammals and insects which in turn compose the prey base for higher orders. For a short term, bark beetles are a food source for several woodpecker.

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<sup>3</sup> More information about USDA Forest Service, Forest Health Monitoring Insect and Disease Risk Map can be found at: <http://www.fs.fed.us/r5/spf/fhp/fhm/risk/index.shtml>



Decomposing logs return nutrients and substrates to the forest floor that are consumed by developing trees or lost during high intensity wildfires.

*Silvicultural Alternative* – Thinning has been proven as the most effective management tool in preventing or mitigating effects from bark beetles and other damage agents (Fettig et al. 2007). Suggested prevention treatments such as maintaining stocking levels below normal (60% or less) reduce resource competition and susceptibility of insect attack, even during times of high beetle population pressure. Pines quickly release when after thinning operations; individual tree resistance in vigor and growth increase.

Stump treatment for the prevention of Annosum root disease is strongly recommended regardless of administrative site classification. Prevention of new infection centers is critical to slowing disease distribution. While pines and firs have differing pathogens, increased mortality due to infection is still the same effect.

*Targeted/High value Selection* – For Jeffrey pines, long-term prevention strategies are strongly encouraged over short-term suppression measures. However, infested tree removal and insecticides can be effective over small areas or on individual high-value trees, but are not recommended for large-scale treatments. In campgrounds or administrative areas, prompt removal of currently infested trees can reduce attack potential on residual live trees, mitigating further loss. Proper treatment of infested wood is necessary for to insure broods are destroyed; slash should also be properly disposed to prevent *Ips* infestations. Insecticide sprays are highly successful at preventing initial beetle attack, but need annual reapplication for continued protection. Cost, timing, application procedures, and feasibility can be further discussed with FHP personnel.

Forest Health Protection supports proactive management that seek to retain stand integrity while improving overall stand resiliency and resistance against potential insect/disease infestation or other disturbance agents. If you have any concerns or require further information regarding this report, please do not hesitate to contact us.

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